

Response Under 37 CFR 1.116  
Expedited Procedure  
Examining Group 1700  
Application No. 10/519,584  
Paper Dated: March 20, 2008  
In Reply to USPTO Correspondence of December 21, 2007  
Attorney Docket No. 1217-045998

### **REMARKS**

Claims 1-2 and 4-6 are pending with claim 1 being the sole independent claim. Claim 1 has been amended to include the feature that the exhaust gas purifying catalyst in the catalyst layer comprises at least one noble metal selected from the group consisting of platinum, palladium and rhodium, and activated alumina. Support for this amendment is provided in originally filed claim 3. Accordingly, claim 3 has been cancelled.

No new matter has been added.

It is respectfully requested that this amendment be entered as it does not introduce new issues that require further search and/or consideration as the features of originally filed claim 3 have already been examined. The proposed amendment also does not raise the issues of new matter and it materially reduces issues for appeal.

The Examiner's reconsideration is respectfully requested in light of the amendments made herein taken with the following remarks.

### **RESPONSE TO REJECTIONS**

The present invention is directed to an exhaust gas purifying catalyst-supported member comprising a metal carrier and a catalyst layer directly formed on a surface of the metal carrier wherein the catalyst layer comprises an exhaust gas purifying catalyst and silicon oxide wherein the weight ratio between the exhaust gas purifying catalyst and silicon oxide in the catalyst layer is in the range of 10:90 to 40:60 and 20:80 to 40:60, respectively. It has been found that the use of a catalyst layer which is rich in silicon oxide, such as that which is within the claimed range, remarkably enhances the adhesion properties of the catalyst layer to the metal carrier without a substantial decrease of the catalytic activity of the catalyst layer. The catalyst of the present invention is a "three way catalyst" that is used for purifying exhaust gas from internal combustion engines of automobiles or the like wherein these gases include carbon monoxide, incomplete combustion hydrocarbon, and nitrogen oxide (CO, HC, and NO<sub>x</sub>) which are purified at the same time and thus contain a noble metal.

Claim 1 is rejected under 35 U.S.C. §102(b) as being anticipated by DE 42 03 807 A1 to Jacob et al. (hereinafter referred to as "Jacob").

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The Office Action asserts that Jacob teaches each and every limitation of claim 1. In particular, the Office Action states that Jacob shows a metal carrier and a catalyst layer directly formed on a surface of the metal carrier wherein the catalyst layer comprises an exhaust gas purifying catalyst and silicon oxide in the range of 10:90 to 40:60. The Office Action bases the rejection on the teachings in the Abstract which refer to a hydrolysis catalyst comprising a support structure coated with a 90-10:10-90 weight ratio mixture of  $\text{Al}_2\text{O}_3$  and  $\text{TiO}_2$ ,  $\text{SiO}_2$ ,  $\text{ZrO}_2$  and/or H-zeolite.

Applicants traverse this rejection for the following reasons.

Claim 1 has been amended to include the feature that the exhaust gas purifying catalyst in the catalyst layer comprises at least one noble metal selected from the group consisting of platinum, palladium and rhodium, and activated alumina. Jacob is directed to providing an apparatus for purifying  $\text{NO}_x$  wherein a urea solution is sprayed onto an evaporator wherein this evaporator is in the form of a flow mixer and the flow mixer acts as a hydrolysis catalyst comprising a support structure coated with a 90-10:10-90 weight ratio mixture of  $\text{Al}_2\text{O}_3$  and  $\text{TiO}_2$ ,  $\text{SiO}_2$ ,  $\text{ZrO}_2$ , and/or H-zeolite. Jacob fails to teach an exhaust gas purifying catalyst-supported member including a catalyst comprising at least one noble metal selected from the group consisting of platinum, palladium and rhodium and activated aluminum, as set forth in amended claim 1.

Accordingly, for the reasons set forth above, it is respectfully requested that the rejection of claim 1 under 35 U.S.C. §102(b) be withdrawn as Jacob fails to teach each and every feature of the invention. Furthermore, the teachings of Jacob would not render this claim obvious, as one having ordinary skill in the art would not be motivated to include a noble metal in the catalyst layer of Jacob for use as a hydrolysis catalyst for  $\text{NO}_x$  purification.

Claims 1-5 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,087,298 to Sung et al. (hereinafter referred to as "Sung") in view of Jacob. The Office Action asserts that Sung shows a metal carrier and a catalyst layer directly formed on a surface of the metal carrier wherein the catalyst layer comprises an exhaust gas purifying catalyst and silicon oxide. This rejection is based on the teachings at column 20, lines 21-36 and column 24, lines 65-67 wherein the support material comprises a high surface area

refractory oxide support such as silica and metal oxides such as alumina, including mixed oxide forms such as silica-alumina wherein the alumina oxide is the exhaust gas purifying catalyst which is mixed with silicon oxide. With respect to the weight ratio between the exhaust gas purifying catalyst and silicon oxide in the catalyst layer, the Office Action acknowledges that Sung fails to teach the particularly claimed ratios and refers to Jacob which teaches a hydrolysis catalyst comprising a support structure coated with a 90-10:10-90 weight ratio mixture of  $\text{Al}_2\text{O}_3$  and  $\text{TiO}_2$ ,  $\text{SiO}_2$ ,  $\text{ZrO}_2$ , and/or H-zeolite. The Office Action further states that it would have been obvious to one having ordinary skill in the art to use the weight ratio as taught by Jacob to avoid urea deposition of the catalyst inlet, fouling of the SCR catalyst and emission of urea and urea-generated particles.

Applicant traverses this rejection for the following reasons.

Sung and Jacob are directed to two entirely different processes and one having ordinary skill in the art would not be motivated to combine the references in the manner suggested in the Office Action. Sung is directed to a catalyst apparatus useful for the treatment of exhaust gases, including motor vehicle engine exhaust gases, to reduce contaminants contained therein. More specifically, Sung is concerned with a catalyst apparatus comprising an upstream catalyst zone and a downstream catalyst zone with improved catalysts including "three-way conversion" or "TWC" catalysts which are polyfunctional in that they have the capability of substantially simultaneously catalyzing the oxidation of hydrocarbons and carbon-monoxide and the reduction of nitrogen oxides.

Jacob is directed to an apparatus for purifying  $\text{NO}_x$  using a hydrolysis catalyst comprising a support structure coated with a 90-10:10-90 weight ratio mixture of  $\text{Al}_2\text{O}_3$  and  $\text{TiO}_2$ ,  $\text{SiO}_2$ ,  $\text{ZrO}_2$  and/or H-zeolite.

One having ordinary skill in the art, when determining the ratios of catalyst materials to silicon oxide in the three-way exhaust catalyst of Sung would not be motivated to look to the Jacob apparatus of purifying  $\text{NO}_x$  using a urea solution with a hydrolysis catalyst. Furthermore, one having ordinary skill in the art would not be concerned with urea deposition of the catalyst inlet, fouling of the SCR catalyst and emission of urea and urea-generated particles, as set forth in the Office Action, in the Sung device, as a urea solution is not applied to the catalyst supported member.

Additionally, neither Sung nor Jacob recognizes the importance of a catalyst which is rich in silicon oxide in terms of the increased adhesion capabilities of the catalyst layer to the metal support. Claim 1 recites that weight ratio between the exhaust gas purifying catalyst and silicon oxide in the catalyst layer is within the range of 10:90 to 40:60. In other words, the presently claimed catalyst layer is silicon oxide rich. As discussed in detail on page 11, lines 9-13 of the present application, by determining the amount of the silicon oxide in the claimed range, adhesion properties of the catalyst layer to the metal carrier can be remarkably enhanced without a substantial decrease of the catalytic activity of the catalyst layer. Accordingly, in the exhaust gas purifying catalyst-supported member of the invention, a specified amount of silicon oxide is contained in the catalyst layer. While the silicon oxide does not directly become an exhaust gas purifying catalyst, the introduction of this silicon oxide into the catalyst layer results in a binding action of the catalyst layer to the metal carrier. Therefore, adhesion between the catalyst layer and the metal carrier is significantly improved so as to enable the application of the catalyst layer directly on the metal carrier.

Accordingly, the claims are directed to an exhaust gas purifying catalyst-supported member having the features that:

- 1) the exhaust gas purifying catalyst comprises at least one noble metal elected from the group consisting of platinum, palladium and rhodium, and activated alumina; and
- 2) the weight ratio between the exhaust gas purifying catalyst and silicon oxide in the catalyst layer is in the range of 10:90 to 40:60.

These features define the present invention over the combined teachings of Sung and Jacob. As discussed in detail above, adhesion properties of the catalyst layer to the metal carrier can be remarkably enhanced without a substantial decrease of the catalytic activity of the catalyst layer. Furthermore, the use of the noble metal results in an excellent gas purifying effect.

For the reasons set forth above, it is respectfully requested that the rejection of claims 1-5 under 35 U.S.C. §103(a) be withdrawn as the combination of Sung with Jacob fails to render these claims obvious.

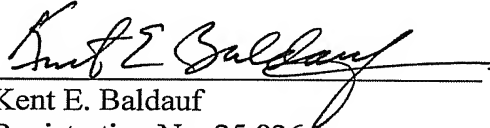
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Claim 6 is rejected under 35 U.S.C. §103(a) as being obvious over the teachings of Sung in view of Jacob and U.S. Patent No. 4,759,918 to Homeier et al. (hereinafter referred to as "Homeier"). The Examiner relies on Homeier as teaching the use of metal mesh filters and asserts that it would have been obvious to use a metal mesh support member for the catalyst in Sung as modified by Jacob in view of Homeier. For the reasons set forth above, the combination of Sung with Jacob fails to teach or suggest the presently claimed invention, thus even if the references were combined in the manner suggested in the Office Action, the presently claimed invention cannot be obtained.

For the reasons set forth above, it is respectfully requested that the rejection of claim 6 under 35 U.S.C. §103(a) be withdrawn as the combination of Sung, Jacob, and Homeier fails to render this claim obvious.

In view of the arguments set forth above and the amendments to the claims, it is respectfully requested that this amendment be entered and all claims in the application, namely claims 1-2 and 4-6, be allowed and the application be passed to issue.

Respectfully submitted,  
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